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Method for determining composition and quality of meat material

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Abstract of EP 0869360 (A2)

Measurement of meat intra- and extracellular water and ratio of lean and fatty contents comprises electrical impedance measurements at four or more frequencies between 1 kHz and 1 MHz. A first evaluation of the ratio between the volumes of total- and extracellular water is made from the quotient K of impedance moduli. The impedances are measured between: (1) 1 kHz and 50 kHz; and (2) 100 kHz and 10 MHz. The value (K) is independent of environmental measurement conditions. In the first stage the experimental results are corrected using the method of least squares. For this, an expression is provided, relating electrical impedance Z with frequency (f), comprising resistances at infinite and zero frequency, frequency of maximum impedance and cell dispersion of the biological system. The resistances are then used to calculate the value E%, related to the ratio of intracellular and extracellular water volumes, using a further equation. In a second stage, the lean meat content is determined. The impedance is determined above 100 kHz. An equation is provided, linking lean mass with the inverse of this impedance, using prior calibration coefficients obtained for meat of similar characteristics and a geometrical factor appropriate to measurement conditions. The total fatty weight is then obtained by subtracting the total lean weight from the total weight of the sample under investigation.

$$Z(f) = R_{\infty} + \frac{R_0 - R_{\infty}}{1 - \left(\frac{f}{f_c}\right)^{1-\alpha}}$$